

REMARKS

This communication is responsive to the Office Action dated November 2, 2005. A petition for a one month extension of the time period for responding to the Action is separately filed herewith. Claims 54-92 remain pending in this application. Applicant respectfully requests reconsideration of the pending claims in view of the following remarks.

Claims 54-60, 62-68, 70-76, 78-84 and 86-92 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,640,278 to Nolan et al. ("Nolan") in view of U.S. Pat. No. 6,813,686 to Black ("Black"). This rejection is traversed.

As explained in the previous response, Applicant's claimed invention accommodates improved management of storage resources in the SAN environment by providing distinct storage domains that have separately configurable storage management properties. An administrator may define different storage domains that correspond to, yet are separate from, the pool of available storage resources. Logical volumes are then allocated to hosts in the context of individual ones of the so-configured storage domains, with allocation of a logical volume subject to the configurable storage management properties of the particular storage domain in whose context the allocation is made.

Accordingly, with Applicant's claimed invention logical volumes for one entity may be allocated in the context of a first storage domain, whereas logical volumes for a second entity may be allocated in the context of a second storage domain. Each of those storage domains has associated configurable storage management properties. Thus, even if the same volume is separately allocated to the two entities, the context of allocation – the particular storage domain – provides the ability to configure and manage the properties of such storage.

Applicant submits that claims 54-60, 62-68, 70-76, 78-84 and 86-92 recite features that are neither disclosed nor suggested in any way by Nolan and Black, whether alone or in any combination.

Nolan discloses the configuration and management of storage resources available in a SAN. This is accommodated by providing a centralized management capability that layers on top of existing SAN hardware infrastructures “to provide high-performance, high availability and advanced storage management functionality for heterogeneous environments.” (Nolan, at 2:3-9). This “storage domain management” of Nolan merely appears to connect the physical capabilities of the SAN with clients in a centralized fashion, and uses interfaces to attempt to ease such management. Accordingly, the “storage domain” of Nolan clearly differs from the Applicant’s claimed storage domain, even in a basic sense. It follows that Nolan offers no disclosure or suggestion regarding the allocation of logical volumes to hosts in the context of a particular storage domain from a plurality of such storage domains, so as to provide such allocation according to the storage management properties associated with that particular storage domain.

As admitted in the Office Action, the current Examiner appreciates that various features recited in independent claim 54 are absent from Nolan. Particularly, Nolan fails to disclose Applicant’s claimed “*defining storage domains ... wherein a first set of storage management properties is associated with a first storage domain and a second set of storage management properties is associated with a second storage domain, with the first set of storage management properties being different from the second set of storage management properties.*” (Office Action, p. 3).

As stated in the Action, Nolan also fails to disclose “*allocating the logical volumes to hosts in the context of the storage domains, wherein allocating a first logical volume to a first*

host in the context of the first storage domain entails the provision of storage resources according to the first set of storage management properties and allocating a second volume to a second host in the context of the second storage domain entails the provision of storage resources according to the second set of storage management properties” as claimed by Applicant. (Office Action, p. 4).

Black does not remedy the deficiencies of Nolan, in that it also fails to disclose or suggest these features. Black also uses the term storage domain. However, like Nolan, despite the use of the term storage domain, there is still no disclosure or any kind of suggestion of the features recited in Applicant’s claim and reproduced in the preceding paragraphs. Particularly, Black does not in any way disclose or suggest defining multiple storage domains with respective, different storage management properties, or the allocation of logical volumes in the context of one of multiple storage domains, as claimed by Applicant.

Black refers to its “storage domain” as an alternative to the conventional “network-centric” architecture, with the “storage domain” being segregated from the host domain, for example as shown in FIG. 8. (Black, 15:41-67). This purportedly eases management of the physical infrastructure as it can be managed separately from the host. Other examples illustrating the storage domain are shown in FIG. 9 (apparently storage network 98), FIG. 10 (storage domain shown separately from host domain), FIG. 11 (storage domain shown separately from host domain, controlled by storage management controller), FIG. 12 (storage domain 121, shown separate from host domain 120), and FIGs. 14, 18 (storage domain 121, separate from host domain 120). Each of these examples merely illustrates the single storage domain, shown segregated from the host domain.

With regard to Applicant’s claimed invention, a review of Black reveals nothing more than its description that its “storage domain” is separate from the host domain. Each and every

reference to the term “storage domain” in Black supports this construction of the reference.

Accordingly, the same features that are admitted to be absent from Nolan are also absent from Black.

Particularly, in Black there is no disclosure or suggestion of “defining storage domains ... wherein a first set of storage management properties is associated with a first storage domain and a second set of storage management properties is associated with a second storage domain, with the first set of storage management properties being different from the second set of storage management properties,” as claimed by Applicant. Nor is there any discussion whatsoever of “allocating the logical volumes to hosts in the context of the storage domains, wherein allocating a first logical volume to a first host in the context of the first storage domain entails the provision of storage resources according to the first set of storage management properties and allocating a second volume to a second host in the context of the second storage domain entails the provision of storage resources according to the second set of storage management properties,” as claimed by Applicant.

The Examiner has cited several passages in Black, but none of them appear to offer any kind of disclosure of these features of Applicant’s claimed invention. For example, the passage on col. 9, lines 35-65 describes a logical volume that may have an identifier that is assigned independently from a host computer. There is no disclosure of even the term storage domains, let alone defining storage domains having different storage management properties, or the particular allocation feature recited in Applicant’s claims.

Column 10, lines 15-55 similarly describe logical volumes that may be assigned an “ELVID”, which is described elsewhere as an enterprise logical volume identifier. Column 11, lines 11-57 also describes the ELVID. These passages merely appear to cite a specific example of a logical volume identifier, basically used to associate a host with resources. Again, there is

absolutely no description of defining storage domains having separate, different storage management properties, or allocation of logical volumes in the context of particular storage domains as claimed.

Column 18, lines 16-27 describe a storage management application (“SMAPP”) that manages manipulation of storage within a storage domain. This merely appears to be an application for managing the storage in the single “storage domain” of Black, as illustrated in FIG. 11. The SMAPP in no way discloses defining multiple storage domains wherein different storage management properties are associated with respective ones of the storage domains, or allocating the logical volumes to hosts in the context of given ones the storage domains, as claimed by Applicant.

Finally, column 20, line 45 through column 21, line 38 merely appear to describe FIG. 12, which discloses the Black concept of providing a segregated storage domain (121), and corresponding access to a logical volume “A” found within that storage domain. It is not seen how this passage or any other description in Black in any way discloses or suggests “defining storage domains ... wherein a first set of storage management properties is associated with a first storage domain and a second set of storage management properties is associated with a second storage domain, with the first set of storage management properties being different from the second set of storage management properties,” or of “allocating the logical volumes to hosts in the context of the storage domains, wherein allocating a first logical volume to a first host in the context of the first storage domain entails the provision of storage resources according to the first set of storage management properties and allocating a second volume to a second host in the context of the second storage domain entails the provision of storage resources according to the second set of storage management properties,” as claimed by Applicant.

Since Nolan and Black fail to disclose these various features that are recited in Applicant's independent claim 54, whether considered alone or in combination, Applicant submits that the Examiner has failed to produce a prima facie case of obviousness.

Also, even if the proposed combination would produce the claimed features, which is not the case, such a combination would be improper as there is no evident motivation to combine the references in the fashion offered by the Examiner. Applicant submits that the Examiner has engaged in an attempt to reconstruct the claimed invention in hindsight, and has failed to set forth a proper basis for an obviousness rejection. The Examiner's statement that "it is obvious to provision more than one storage domain and to allocate resources based upon the properties of each domain" (Office Action, p. 4) merely reiterates that the references, even in combination, fail to disclose Applicant's claimed invention, and that the Examiner is engaged in a failed attempt to reconstruct Applicant's claimed invention in hindsight.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of independent claim 54 as being obvious over Nolan in view of Black.

For reasons similar to those provided regarding claim 54, independent claims 62, 70 and 78 are also neither disclosed or suggested by Nolan, and Applicant requests reconsideration and withdrawal of the rejection of those claims.

Claims 59-60, 63-68, 71-76, 79-84 and 86-92 depend from these independent claims and thus are distinct from Nolan and Black, taken alone or in combination, for the reasons cited above. The additional features found within the independent claims are also absent from Nolan and/or Black, particularly in the claimed context.

Moreover, various dependent claims highlight the Examiner's failure to appreciate the core differences between Applicant's claimed invention and the "storage domain" of either Nolan or Black. For example, claim claims 56, 64, 72 and 80 recite that "the first logical volume and the

second logical volume are a *common logical volume*, with allocation of the common logical volume to the first host subject to the first set of storage management properties and allocation of the common logical volume to the second host subject to the second set of storage management properties.” As purported disclosure of these features, the Examiner refers to Nolan’s disclosure of logical partitioning of a physical storage device. This is a well known technique, and does not disclose having the same *common logical volume* as claimed. Moreover, nothing in Nolan (or Black) in any way discloses or suggest having this common logical volume being allocated in the context of one storage domain to have a first set of storage management properties, and having the very same common logical volume being allocated in the context of a second storage domain to have second, different storage management properties in the fashion claimed by Applicant.

Other dependent claims are similarly neither disclosed nor suggested by Nolan and/or Black. For example, with reference to claims 57-60, 65-68, 73-76 and 81-84, with Applicant’s claimed invention the allocation of logical volumes may automatically include various guarantees (storage capacity, bandwidth, availability) by providing such allocation in the context of the storage domain having the noted guarantees in its storage management properties. The mere description in Nolan and/or Black that providing high capacity, bandwidth, and availability are desirable or potentially present in a storage network does not equate to providing particular guarantees by virtue of having allocation of a logical volume being made in the context of a given storage domain (from among multiple storage domains) to provide such guarantees for the allocated volume. The single “storage domains” of Nolan and Black offer no such disclosure of these features.

Finally, with regard to claims 86, 88, 90, and 91, there is clearly no disclosure or suggestion of allocation such that first and second classes of service are provided as claimed.

For the foregoing reasons, Applicant requests reconsideration and withdrawal of the rejection of claims 54-60, 62-68, 70-76, 78-84 and 86-92 under 35 U.S.C. § 103(a) as being unpatentable over Nolan in view of Black.

Claims 61, 69, 77 and 85 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nolan in view Black, and further in view of Hubis et al. (Hubis). This rejection is traversed.

Claims 61, 69, 77 and 85 incorporate the features recited in their respective independent claims. Nolan and Black, taken alone or in combination, fail to disclose the features recited in the independent claims. Nor does Hubis in any way disclose such features. Accordingly, Applicant requests reconsideration and withdrawal of the rejection of claims 61, 69, 77 and 85.

For the foregoing reasons, reconsideration and allowance of the claims which remain in this application are solicited. If any further issues remain, the Examiner is invited to telephone the undersigned to resolve them.

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Respectfully submitted,

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